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Risks to Young Volunteers in International Social Projects

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Background: The number of young volunteers in international social projects has increased significantly with governmental and non-governmental project support. This paper investigates the hypothesis that the preventative medical advice currently given prior to departure is inadequate because the risk profile of young persons (<30 years) differs from that of the general population.

Methods: A retrospective cross-sectional study was performed with participants of international social projects. A specific questionnaire was developed; inclusion criteria were age between 18 and 30 years at departure and a duration with the project of at least 6 months.

Results: One hundred and fifty-three data sets could be evaluated. Fifty-three percent were females; the destinations were as follows: 65.4% to Asia, 14.4% to Africa, and 10.5% to Latin America. The mean age was 20 years. Ninety percent of the participants received some kind of advice in travel medicine prior to departure. The vaccination rate was quite good, but pertussis (13.7%), yellow fever (80%), typhoid fever (54%), and rabies (49.7%) should be improved when travelling to high-risk regions. Food is a very important potential source of problems as 66% receive catering by the project, 56.2% from street stalls, and 44% were regularly invited to dine with locals. In Africa, only two-thirds of the participants of projects had regular access to safe water and the sanitary facilities were also poor; 51.7% of respondents reported new sexual contacts (one to more than six new partners). In most cases, condoms were used, but there were two unintended pregnancies.

Conclusions: We conclude that young people need to be targeted with specialized advice for health and safety while abroad. This should highlight age-specific risks compared to advice for a more general population. Vaccination status should be improved for some regions and diseases.

Keywords: hygiene; non-governmental organizations; prevention; sanitary facilities; sexual contacts; social projects; travel medicine; vaccinations

INTRODUCTION

The number of non-governmental organizations (NGOs) and consequently the number of young volunteers who travel to distant countries to work on social projects has increased in the last decade. After tourist travellers, overseas employees, and trained development workers, more and more young adults seek pre-travel medical advice and general assistance during seminars prior to departure. Most of these young adults have just completed their final high school diploma. In most cases, advice is extra polated from traditional risk profiles of other (>30 years old) travellers because the risk profile for young volunteers

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has not yet been established. It is postulated that the risk profile of young adults working in NGOs for a longer period of time could differ from those of tourist travellers aged 30+ years or older employees working in international business and industry (Chatterjee, 1999; Lopez-Velez and Bayas, 2007; Croughs *et al.*, 2008; Aro *et al.*, 2009). There is therefore a need to evaluate the actual risks to which young volunteers of NGOs are exposed or expose themselves to during their time abroad. The need for such a specific risk assessment grows with the increasing numbers of young volunteers following the support for projects such as the weltwärts program by the Federal Ministry for Economic Cooperation and Development in Germany (www.weltwaerts.de). This increase is indicated by the number of young people who are trained and get their insurance for the time abroad by fid-Service: in 1995, there were 243 young persons who left to foreign countries; the number increased to 722 in 2001, to 1070 in 2004, and to 2329 in 2009 (data from fid-Service: see below). Recently, there were >100 000 volunteers of any age group working worldwide in social projects (Bhatta *et al.*, 2009).

Objectives

To get detailed information about the risk of young volunteers and to analyse it in order to improve the preventive approach with a focus on specific risks such as age, extended stay, and activity in social projects thereby minimizing a risk exposure during the time abroad. This study describes an attempt to take account of such risks.

MATERIALS AND METHODS

A questionnaire was designed that included common risk sources as well as those that were expected to differ from known risk profiles. More than 100 questions covered topics regarding general information, infectious as well as non-infectious risk sources, subjective evaluations, and comments. Depending on the structure of the question, the participants could choose to give only one answer or choose several items from a list. In the latter, the answers added up to >100%.

The questionnaire was sent to all participants who attended the training courses from 2001 to 2006 and who fulfilled the inclusion criteria as they were aged between 18 and 30 years at the date of departure and had participated in a social project for a period of at least 6 months. This resulted in 745 potential participants. The study design was a retrospective cross-sectional study. The questionnaire, which was answered anonymously, was sent to young adults who had returned from voluntary service abroad between 2001 and 2006 and had joined a training course of the 'fid-Service- und Beratungsstelle in der Arbeitsgemeinschaft für Entwicklungshilfe (AGEH)' (http://www.ageh.de/). This is a service and consulting centre that offers organizations that send volunteers abroad, as well as advice to individual young volunteers, professional advice and assistance, facilitates an exchange of knowledge and experiences with their peers, provides insurances, arranges training courses, and preparation seminars pre-departure as well as during a stay abroad. The service addresses any German-speaking NGO. However, the big organizations like the German Red Cross have their own courses and traditionally, the majority of the customers or parti-cipants of the fid-Service are organizations or persons of the Roman Catholic and the Protestant church.

As part of a pilot study, 10 volunteers who were <30 years and had returned from their stay abroad were asked to complete the questionnaire and to comment on layout, clarity, and relevance after their return. Minor changes were made subsequently. The ethical commission of RWTH Aachen University fully endorsed the study design. For the duration of the study period, an email account was established. The final questionnaire was sent from this email account in November 2007. Anonymous completed questionnaires could be returned via email or to a postal address. Reminder emails were sent and the final entry deadline was 20 January 2008. Incoming questionnaires were saved and the emails deleted or envelopes destroyed so that questionnaires could not be traced back to senders. Results of the questionnaires were collected in Adobe Acrobat Professional and exported to an Excel chart on which the descriptive analyses are based.

The huge amount of data forced us to focus on hygiene (general, water, food), preventive advice before departure (vaccinations, safety, health prevention), sexual behaviour, and safety (traffic, conditions at work) here. Other aspects like diseases while staying abroad (malaria, dengue, etc.), the need of therapy (self-administered drugs, clinic, out-/inpatients), equipment for medical emergencies, and check-up after return are published elsewhere (Kupper *et al.*, submitted).

RESULTS

Seven hundred and forty-five emails were sent out; 94 of those could not be delivered due to invalid email addresses. Accordingly, 651 emails had been received by potential participants, of whom 10 answered that they did not fulfil the requirements.

One hundred and seventy-three emails were returned, but 20 of those had to be sorted out because of not fulfilling the inclusion criteria, technical errors, or double reception. Therefore, 153 questionnaires of a quorum of 641 could be evaluated, which implies a response rate of 24%.

The 153 volunteers were spread over different continents during their time abroad, a detailed distribution is shown in Table 1. The average duration within the social project was 11.2 months (Table 2). Fifty-three percent were female and the mean age was 20 years, which correlates with a high school diploma as the most common standard of education (95.4%; Table 3). Domiciles were mostly either rural (31.1%, <5000 inhabitants) or urban areas (46.4%, >1 000 000) and in 57.5% located between sea level and 1500 m altitude (Table 4).

Travel medicine advice

Ninety percent of the young adults travelling to Africa, Asia, and Latin America sought medical advice before departure. The family physician (general practitioner) service (56.3%) was the most often used, while services of a tropical institute (27.8%) or a specialized doctor (29.4%) were also made use of, as well as personal research online or in literature (33.3%). On the other hand, the data suggest that 10% went to potentially high-risk countries without specific information. Volunteers to other countries (USA, Europe, Australia) sought for medical advice in 37.5% only, but these countries are commonly judged as low-risk countries.

For 92.2% of the volunteers, the participation in a social project was the first stay in another country for >2 weeks; 7.1% reported experience of travelling for >2 months to foreign countries. Thirty percent had visited the country of the social project or a neighbouring country before, while 70% did not have any idea about the country of destination or even the region.

Vaccinations

We asked about vaccinations performed specifically for the stay abroad and those that had been done independently from the actual travel. In total, by the time of departure, a large number of volunteers were immunized against measles/mumps/rubella (83.0%), poliomyelitis (92.2%), diphtheria (80.4%), tetanus (96.7%), hepatitis A (89.5%), and hepatitis B (95.4%). Among those going to Africa and Latin America, only one in two were vaccinated against rabies, compared to 80% of volunteers sent to Asia and 37.5% of those stationed in other continents. Protection against pertussis (documented vaccination) was present in 13.7% of the young adults; 81.8% of Africa volunteers and 70.0% of Latin America volunteers were vaccinated against yellow fever (Table 5). In total, 64% were vaccinated against typhoid fever (Africa: 59.1%; South Asia: 73.3%).

Project work

Social activities were mostly to teach (75.8%) or to initiate games or sports (64.1%). Hence, school or institutionalized children (64.7%) as well as adolescents (62.1%) were the groups with most frequent contact to the volunteers. In Africa, maintenance work was a common task for volunteers (59.1%); 37.5% carried out some form of wound care, especially in Africa and Latin America.

Meals

Sixty-six percent of the volunteers had community catering provided in their projects that supplied half of their daily meals. Self-prepared food (46.4%), meals from small restaurants or street stalls (56.2%), or invitations to locals (44.4%) were other common sources that made up a share of daily food.

Table 2. Average duration of stay abroad.

Region	Stay abroad		
All destinations	$N = 150$	100%	11.2 months
Africa	$n = 21$	14.0%	12.3 months
Asia	$n = 15$	10.0%	8.9 months
Latin America	$n = 98$	65.3%	11.8 months
Others	$n = 16$	10.7%	11.6 months

Table 1. Country of destination of the collective.

Region			Country of destination
Africa	$N = 22$	14.4%	Kenya (5), Zambia (4), Tanzania (4), South Africa (3), Uganda (2), Burkina Faso, Congo, Ghana, Namibia
Asia	$N = 15$	9.8%	India (6), Bangladesh (5), Nepal (3), Philippines
Latin America	$N = 100$	65.4%	Bolivia (23), Brazil (17), Chile (13), Nicaragua (8), Ecuador (8), Argentina (7), Mexico (7), Honduras (5), Peru (5), Guatemala (3), El Salvador, Colombia, Paraguay
Others	$N = 16$	10.5%	Romania (5), Australia (2), Sweden (2), Estonia, France, Great Britain, Italy, Lithuania, USA, Hungary

Water supply

More than half of the volunteers obtained industrially bottled drinking water. If not, it most frequently came off a city water pipe (62.7%). Very few scooped water directly from a pump or a spring (6.5%) and only volunteers stationed in Latin America used surface water that came via pipe (4.6%). Approximately two-thirds of volunteers in Africa and Asia treated their non-industrially filled water, while only 50% of the volunteers in Latin America did. Boiling was the method that was most often used and this was mainly based on individual initiatives. Water

Table 3. Sex and age at departure.

	All destinations		Africa		Asia		Latin America		Others	
	$N = 151$	100%	$n = 22$	14.6%	$n = 14$	9.3%	$n = 99$	65.6%	$n = 16$	10.6%
Female	80	53.0%	9	40.9%	11	78.6%	52	52.5%	8	50.0%
Male	71	47.0%	13	59.1%	3	21.4%	47	47.5%	8	50.0%
Average age	20.0 years		20.2 years		19.6 years		20.1 years		19.6 years	

Table 4. Size and altitude of the volunteer's destination.

	All destinations		Africa		Asia		Latin America		Others	
Inhabitants	$N = 151$	100%	$n = 21$	13.9%	$n = 14$	6.6%	$n = 100$	66.2%	$n = 16$	10.6%
>1 000 000	33	21.9%	6	28.6%	2	14.3%	22	22.0%	3	18.8%
>100 000	37	24.5%	6	28.6%	4	28.6%	22	22.0%	5	31.3%
>20 000	25	16.6%	1	4.8%	0	0.0%	19	19.0%	5	31.3%
>5000	9	6.0%	2	9.5%	1	7.1%	6	6.0%	0	0.0%
>500	28	18.5%	4	19.0%	3	21.4%	19	19.0%	2	12.5%
<500	19	12.6%	2	9.5%	4	28.6%	12	12.0%	1	6.3%
Altitude (m)	$N = 145$	100%	$n = 21$	14.5%	$n = 15$	10.3%	$n = 95$	65.5%	$n = 14$	9.7%
>3500	5	3.4%	0	0.0%	0	0.0%	5	5.3%	0	0.0%
>2500	21	14.4%	0	0.0%	0	0.0%	21	22.1%	0	0.0%
>1500	33	22.6%	10	47.6%	5	33.3%	16	16.8%	2	14.3%
>0	84	57.5%	10	47.6%	10	66.7%	52	54.7%	12	85.7%
<0	2	1.4%	1	4.8%	0	0.0%	1	1.1%	0	0.0%

Table 5. Vaccination status before departure.

	All destinations		Africa		Asia		Latin America		Others	
	$N = 153$	100%	$n = 22$	14.4%	$n = 15$	9.8%	$n = 100$	65.4%	$n = 16$	10.5%
M/M/R[a]	127	83.0%	19	86.4%	12	80.0%	81	81.0%	15	93.8%
Polio	141	92.2%	21	95.5%	15	100.0%	92	92.0%	13	81.3%
Diphtheria	123	80.4%	18	81.8%	13	86.7%	82	82.0%	10	62.5%
Tetanus	148	96.7%	21	95.5%	15	100.0%	97	97.0%	15	93.8%
Pertussis	21	13.7%	2	9.1%	3	20.0%	14	14.0%	2	12.5%
Typhoid fever	83	54.2%	13	59.1%	11	73.3%	56	56.0%	3	18.8%
Influenza	10	6.5%	3	13.6%	1	6.7%	5	5.0%	1	6.3%
Hepatitis A	137	89.5%	21	95.5%	14	93.3%	92	92.0%	10	62.5%
Hepatitis B	146	95.4%	21	95.5%	14	93.3%	98	98.0%	13	81.3%
Yellow fever	90	58.8%	18	81.8%	1	6.7%	70	70.0%	1	6.3%
Rabies	76	49.7%	12	54.5%	12	80.0%	46	46.0%	6	37.5%
Meningococcal	45	29.4%	12	54.5%	7	46.7%	19	19.0%	7	43.8%
Others	16	10.5%	1	4.5%	7	46.7%	6	6.0%	2	12.5%

[a]Measles/mumps/rubella.

for dental hygiene was commonly obtained from city water pipes (68.6%) or from pipes that came from a fountain (22.9%; Table 6).

Toilet facilities

Overall, toilet facilities in the volunteers' residences seemed to be better equipped than those in their projects. Volunteers stationed in African projects mainly had to deal with a latrine (40.9%) or not fully functional lavatories (40.9%), volunteers stationed in Asia mostly used unmaintained squat toilets (46.7%), and volunteers stationed in Latin America used lavatories with varying standards of hygiene (94.0%). Sanitary facilities in volunteer residences in Africa were not fully functional lavatories (68.2%), while their share in Asia was 40.0%, and 26.7% utilizing unmaintained squat toilets. Lavatories in Latin America were either not properly installed (46.0%) or in poor hygienic conditions (47.0%; Table 7).

Sexual behaviour

Half the volunteers (51.7%) had a new sexual contact while abroad; most reported one (54.5%) or two to three (33.8%) new partners, 7.8% mentioned four to five, and three volunteers (3.9%) in Latin America six or more (Table 8). New partners were mostly locals (83.1%); the most common claimed contraceptive measure was condom use (92.2%). Two females stationed in Latin America mentioned unintended pregnancies of which one resulted in a miscarriage and one in a therapeutic abortion; 34.3% reported being concerned about sexually transmitted diseases or unintended pregnancies (Table 9) and 40.1% were tested for such infections during or after their time abroad, all without a positive diagnosis of a disease. The concept of living without sexual contacts during the time spent in social projects was considered unrealistic by one in four volunteers; 75.3% thought it to be potentially realistic (Table 10).

DISCUSSION

Advice in travel medicine

Most of the young volunteers travelling to (sub)-tropical destinations tried to get medical advice before departure. Sharp *et al.* (1995) reported on pre-departure advice sought by 84% of European or North American journalists and relief workers stationed in Somalia. Han *et al.* (2010) mention that pre-travel medical care was received by only 19% of US Americans aged <18 years who travelled to unindustrialized countries and this was mainly purely for immunizations. Other studies showed that 50–83% of tourists travelling to developing countries made use of medical consultations (Chatterjee, 1999; Van Herck *et al.*, 2004; Ropers *et al.*, 2008; Wang *et al.*, 2008). Compared to these findings, more of the studied young volunteers were counselled and briefed. It would be desirable that all volunteers received medical advice prior to departure.

As in other studies (Townend, 1998; Waner *et al.*, 1999; Van Herck *et al.*, 2004; Hartjes *et al.*, 2009; Han *et al.*, 2010), travel consultations were given mostly by family physicians without further certification in travel or tropical medicine. The quality of the advice given to them may be questioned (Hatz *et al.*, 1997; Ropers *et al.*, 2004). About one-third of young volunteers studied consulted a specialized doctor. Similarly, in a study of American students,

Table 6. Water supply at the destination.

	All destinations		Africa		Asia		Latin America		Others	
	$N = 153$	100%	$n = 22$	14.4%	$n = 15$	9.8%	$n = 100$	65.4%	$n = 16$	10.5%
Drinking water										
Communal water pipe	96	62.7%	9	40.9%	5	33.3%	43	43.0%	12	75.0%
Fountain, via pipe	29	19.0%	7	31.8%	4	26.7%	16	16.0%	2	12.5%
Stream/pond, via pipe	7	4.6%	0	0.0%	0	0.0%	7	7.0%	0	0.0%
Pump or spring	10	6.5%	3	13.6%	3	20.0%	4	4.0%	0	0.0%
Bottles, industrially filled	87	56.9%	12	54.5%	10	66.7%	60	60.0%	5	31.3%
For teeth brushing										
Communal water pipe	105	68.6%	12	54.5%	7	46.7%	72	72.0%	14	87.5%
Fountain, via pipe	35	22.9%	7	31.8%	7	46.7%	19	19.0%	2	12.5%
Pond, via pipe	15	9.8%	1	4.5%	0	0.0%	14	14.0%	0	0.0%
Fountain	8	5.2%	4	18.2%	2	13.3%	2	2.0%	0	0.0%
Bottles, industrially filled	9	5.9%	1	4.5%	2	13.3%	6	6.0%	0	0.0%

Table 7. Sanitary facilities at the destination.

	All destinations		Africa		Asia		Latin America		Others	
	$N = 153$	100%	$n = 22$	14.4%	$n = 15$	9.8%	$n = 100$	65.4%	$n = 16$	10.5%
Project										
Lavatories, cleaned daily, lockable, soap	43	28.1%	4	18.2%	0	0.0%	30	30.0%	9	56.3%
Lavatories, one or more of these points	59	38.6%	9	40.9%	4	26.7%	40	40.0%	6	37.5%
Lavatories, unsafe water supply or unmaintained	26	17.0%	1	4.5%	0	0.0%	24	24.0%	1	6.3%
Squat toilets, cleaned daily, lockable, soap	9	5.9%	3	13.6%	5	33.3%	1	1.0%	0	0.0%
Squat toilets, one or more of these points	9	5.9%	1	4.5%	7	46.7%	1	1.0%	0	0.0%
Squat toilets, unsafe water supply, defects	4	2.6%	0	0.0%	1	6.7%	3	3.0%	0	0.0%
Latrine: pit without flush and hand washing facility	15	9.8%	9	40.9%	0	0.0%	6	6.0%	0	0.0%
None	12	7.8%	2	9.1%	0	0.0%	9	9.0%	1	6.3%
Residence										
Lavatories, cleaned daily, lockable, soap	61	39.9%	2	9.1%	4	26.7%	47	47.0%	8	50.0%
Lavatories, one or more of these points	75	49.0%	15	68.2%	6	40.0%	46	46.0%	8	50.0%
Lavatories, unsafe water supply or unmaintained	17	11.1%	3	13.6%	1	6.7%	13	13.0%	0	0.0%
Squat toilets, cleaned daily, lockable, soap	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Squat toilets, one or more of these points	6	3.9%	1	4.5%	4	26.7%	1	1.0%	0	0.0%
Squat toilets, unsafe water supply or unmaintained	1	0.7%	0	0.0%	0	0.0%	1	1.0%	0	0.0%
Latrine: pit without flush and hand washing facility	9	5.9%	1	4.5%	1	6.7%	7	7.0%	0	0.0%
None	1	0.7%	0	0.0%	0	0.0%	1	1.0%	0	0.0%

Table 8. New sexual contacts during the stay abroad.

	All destinations		Africa		Asia		Latin America		Others	
	$N = 149$	100%	$n = 20$	13.4%	$n = 15$	10.1%	$n = 98$	65.8%	$n = 16$	10.7%
None	72	48.3%	11	55.0%	12	80.0%	39	39.8%	10	62.5%
Yes	77	51.7%	9	45.0%	3	20.0%	59	60.2%	6	37.6%
	$N = 77$		$n = 9$		$n = 3$		$n = 59$		$n = 6$	
1	42	54.5%	6	66.7%	2	66.7%	29	49.2%	5	83.3%
2–3	26	33.8%	2	22.2%	1	33.3%	22	37.3%	1	16.7%
4–5	6	7.8%	1	11.1%	0	0.0%	5	8.5%	0	0.0%
≥6	3	3.9%	0	0,0%	0	0.0%	3	5.1%	0	0.0%

Table 9. Volunteers concerned about STDs or unintended pregnancy.

		All destinations		Africa		Asia		Latin America		Others	
		$N = 149$	100%	$n = 22$	14.8%	$n = 14$	9.4%	$n = 97$	65.1%	$n = 16$	10.7%
Major concern	1	7	4.8%	2	9.1%	0	0.0%	5	5.2%	0	0.0%
	2	22	15.1%	4	18.2%	1	7.1%	15	15.5%	2	12.5%
	3	21	14.4%	2	9.1%	1	7.1%	17	17.5%	1	6.3%
	4	25	17.1%	3	13.6%	1	7.1%	18	18.6%	3	18.8%
	5	32	21.9%	6	27.3%	4	28.6%	19	19.6%	3	18.8%
No concern	6	42	28.8%	5	22.7%	7	50.0%	23	23.7%	7	43.8%

STDs, sexually transmitted diseases.

Table 10. Concept of time abroad without sexual contacts.

		All destinations		Africa		Asia		Latin America		Others	
		$N = 150$	100%	$n = 21$	14.0%	$n = 14$	9.3%	$n = 100$	66.7%	$n = 15$	10.0%
Unimaginable	1	3	2.0%	0	0.0%	0	0.0%	2	2.0%	1	6.7%
	2	15	10.0%	2	9.5%	0	0.0%	12	12.0%	1	6.7%
	3	19	12.7%	0	0.0%	1	7.1%	17	17.0%	1	6.7%
	4	21	14.0%	0	0.0%	1	7.1%	17	17.0%	3	20.0%
	5	36	24.0%	8	38.1%	2	14.3%	23	23.0%	3	20.0%
Realistic	6	56	37.3%	11	52.4%	10	71.4%	29	29.0%	6	40.0%

24% were advised by a travel medicine doctor (Hartjes *et al.*, 2009). These doctors have additional training in travel or tropical medicine topics and counsel travellers resulting in more experience and possibly a better briefing (Ruis *et al.*, 2009). Consequently, consultation with a specifically trained physician should ideally be recommended. Online or literature researches are additional sources of information but need to be questioned if the only source since information offered online is often fragmentary (Sing *et al.*, 2000; Horvath *et al.*, 2003). This information is often generalized and therefore disregards individual as well as local risk factors. Sources of information for young volunteers are generally the same as those of tourist travellers (Van Herck *et al.*, 2004; Ropers *et al.*, 2008). This implies that specific aspects of young adults, long-term travel or work in social projects, get insufficient attention. This is of special interest as obviously the participants had minor, most of them no, travel experience in the country or region of their social project or even no travel experience in foreign countries at all.

Vaccinations

For reasons of practicability, the vaccination status was not verified by screening the vaccination documents. The low number of pertussis vaccinations is surprising, especially regarding the fact that more than half of the volunteers had worked with children in their social project.

More than 70% of the volunteers in Asia were vaccinated against typhoid fever, which is gratifying but should be improved. Typhoid fever as well as other systemic salmonella infections are severe diseases and responsible for >100 000 deaths a year, especially in high-risk areas as the Indian subcontinent (Haditsch, 2011). Since only efficient vaccinations against typhoid fever are available, improved prophylaxis in the form of food/drink and sanitary hygiene is essential (Haditsch, 2011); 82% of journalists and relief workers from Europe and North America based in Somalia were vaccinated against typhoid fever, which is slightly more than in our collective (Sharp *et al.*, 1995).

Except for one person, the yellow fever vaccination status was fully consistent with exposure. One volunteer heading for USA was vaccinated but due to another trip (he combined the travel to the social project with vacation in Central America). One person whose project was in Asia received yellow fever vaccination although there was no indication to do so. This indicates a good awareness for yellow fever when preventive advice is given.

The vaccination status against rabies is remarkable since many projects are in rural regions and Africa and some parts of Asia are high-risk areas on one hand and vaccines for post-expositional vaccination are not available in such regions due to the lack of infrastructure. In Latin America, bats are reported to be the most important vectors for rabies transmission. Here, the vaccination rate of 46% is acceptable if combined with the advice to avoid caving. In contrast, the rate of 54.5% of vaccinated persons in African projects is not adequate since World Health Organization (WHO) reports that Africa and some Asian countries (India, Nepal, and others) having the highest risk for rabies worldwide.

Meningitis is a complex topic. Some countries have recommendations or obligatory regulations for vaccination, e.g. children from foreign countries who spend a year at school (Australia, USA, Canada, and others). Some of the regulations seem to be more political than based on epidemiological data: The main virus in Central Europe is meningitis B, but in contrast to meningitis C (which is the most important one, e.g. in Australia) there is no vaccination against meningitis B and therefore the effect to vaccinate people in Central and Northern Europe is very limited. The risk in Africa is extremely dependent on the seasons: in Western Africa, the risk increases for a couple of weeks in spring, while it is comparable to those of Europe during the rest of the year. Summarized, the vaccination of travellers is a highly individual decision that, of course, must take into account not only

the local obligatory rules but also individual factors like the season, the individual's work, and others. To check whether the vaccinations reported in our study were adequate or not is impossible because even more details about such information would be necessary. But a total of 54.5% vaccinated people in Africa should be acceptable.

In summary, the vaccination status is better than that of tourists in other studies (Townend, 1998; Schunk *et al.*, 2001; Van Herck *et al.*, 2004; Han *et al.*, 2010), which may be attributed to the longer stay abroad and therefore a better medical travel consultation prior to departure. Nevertheless, some immunization rates should be optimized for high-risk regions, e.g. measles for Africa, pertussis for all destinations, and rabies for Asia and Africa.

Project work

Unsurprisingly, activities within projects were frequently associated with school or institutionalized children and adolescents. In another study of volunteers mainly working in Africa or Asia, 68% mentioned teaching or counselling as main activities (Bhatta *et al.*, 2009). Children are important carriers of infection since the rates of many infections decrease with age. This calls for an adequate immunization, e.g. against mumps, rubella, measles, and pertussis. Importantly, it should be noted that the diagnosis of pertussis in adults is typically delayed because the symptoms are less specific ('whooping cough' is often missing). This implies a subsequently longer period of transmission. There is also the problem that the number and severity of complications like rib fractures (also serial fractures with consecutive respiratory insufficiency), pneumothorax, carotis dissection, and cerebral bleeding increase with age. Recently, Goebbels *et al.* (2011) discussed in detail how difficult the diagnosis may be in a remote region with a poor or absent medical infrastructure.

Meals

More than half of the young volunteers felt unconcerned about safety topics regarding hygiene and health aspects of meals within their project or with locals. Good social relations between volunteers and locals are important but this has to be balanced with the low standards of hygiene in some countries. Other studies showed that many travellers do not comply with recommended food restrictions and ignore preventive medical advice to avoid potentially infectious food or drinks (Kozicki *et al.*, 1985; Steffen, 2003; Rack *et al.*, 2005). The often-quoted slogan 'cook it, peel it or forget it' does not guarantee safe food since heat-stable toxins may be released while cooking (Kupper *et al.*, 2008; Kupper, 2010). Finally, information regarding local meals should include typical food of the country as well as a possible lack of diversity in host families or project catering.

Water supply

Only 60% of young volunteers stationed in Africa, Asia, and Latin America mentioned industrially filled bottles as their main source of drinking water. Drinking water of other origin was usually boiled before consumption; filtration or disinfection was only used in few cases. Good filtration is a well-established and effective method to purify water from pathogens; disinfection minimizes the quantity of pathogens but cannot convert faecally contaminated water into fully hygienic drinking water (Schoenen, 2002). Boiling is the most efficient method and also easy to control (Schoenen, 2002; Kupper, 2010; Kupper *et al.*, 2010); the frequent use of this method is therefore not unexpected. Even though this method is effective and quite safe against technical errors, there is the disadvantage of high energy consumption and consequently high costs (Mintz *et al.*, 2001; Kupper *et al.*, 2010). In rural regions, boiling also contributes significantly to deforestation. The number of volunteers drinking untreated water from springs, pumps, currents, or ponds was surprising. This demonstrates a rather careless use of unsafe drinking water. According to the WHO, most diarrhoeas are caused by water contaminated with bacterial, viral, or parasitic organisms (www.who.int). Hence, many diseases, e.g. *E. coli* enteritis, cholera, typhoid fever, poliomyelitis, or hepatitis A and E, may be transmitted by contaminated water (www.who.int) (Schoenen, 2002). In this context, the low typhoid fever vaccination coverage in volunteers in this study, especially in high-risk areas of Asia, needs to be remembered. Young volunteers need to be made aware of the relevance of industrially bottled or adequately treated potable water. The need for good hygiene may be seen as impolite or even offending when coping with invitations from locals and may need to be addressed in role-play games in pre-departure seminars.

Sanitary facilities

The generally better equipped sanitary facilities in the volunteers' residences deserve to be mentioned. Twelve of the 153 volunteers reported that they had no access to such facilities within their social project. Non-existent or inadequate sanitary facilities leave uncontrolled contamination possibilities for faecal-oral transmitted infections (Haditsch, 2011). The high proportion of squat toilets in Asian

projects should be noted because they represent common local sanitary equipment and they are generally considered to be hygienic due to lack of skin contact with the facility itself and therefore a minimized transmission of germs. Nevertheless, such sanitary facilities, as well as latrines, require adjustments by young volunteers. Such adaptations as well as a possible lack of hygiene should be addressed in pre-departure consultations and combined with behavioural and hygiene advice.

Sexual behaviour

More than half of the young volunteers (51.7%) reported having had one or more new sexual partners during their time in a social project. Tourists in other studies reported sexual intercourse in 5% (Cabada *et al.*, 2003; Croughs *et al.*, 2008), but the obviously younger population of medicine students of another study reported that 32% of them had new sexual partners while on holidays (Finney, 2003; Rogstad, 2004). Batalla-Duran *et al.* (2003) reported about British tourists in Tenerife that 35% had sexual intercourse with a non-regular partner (Rogstad, 2004). Men (32%) were no different from women (39%), but the latter were more likely than men to have sex with non-British partners (43 versus 19%; Batalla-Duran *et al.*, 2003; Rogstad, 2004). With regard to our study, the result of this investigation that younger people (<26 years) were more likely to have a new sexual partner than those >25 years (50 versus 22%) should be pointed out. This is comparable to the study of Finney (2003) but remarkably less than in our study. This may be a consequence of the pre-departure training.

Red Cross expatriates who in average stayed abroad 11 months reported new sexual contacts in 29% of cases (Dahlgren *et al.*, 2009). This higher rate of new sexual contacts than in some studies in tourists is attributed to the longer stay abroad and the younger age of volunteers in our study, two aspects that represent risk factors for new sexual contacts while abroad (Houweling and Coutinho, 1991; Cabada *et al.*, 2003;Memish and Osoba, 2006; Ward and Plourde, 2006; Dahlgren *et al.*, 2009). Young volunteers in Latin America showed a higher frequency of new sexual partners than other volunteers. This might be a statistical problem because the groups working in other continents were relatively small in our study, but it might also be a consequence of the attitude of locals and their open-minded handling of sexuality (Croughs *et al.*, 2008). As in other studies, more than four of five new sexual contacts (83.1%) were with locals (Cabada *et al.*, 2002; Croughs *et al.*, 2008). This might be due to a long-term stay and close contact to locals during social projects. The more frequent use of condoms as a preventive measure (92.2%) compared to older studies in which only 20–63% mentioned a regular use of condoms could be attributed to a greater awareness of HIV/AIDS especially in African and Asian countries (Houweling and Coutinho, 1991; Abdullah *et al.*, 1998; Ward and Plourde, 2006). Aro *et al.* (2009) mention the relation between perceived HIV risk and the willingness to take health risks. Volunteers in this study were tested for sexually transmitted infections more often than expatriates in other studies (Dahlgren *et al.*, 2009), even though Aro *et al.* (2009) suggest encouraging all young people to attend sexual screens after time abroad. This shows an existing awareness of these diseases that should be highlighted in pre-departure seminars, combined with the importance of stressing condom use and the influence of alcohol and drugs on risky behaviour (Cabada *et al.*, 2009). The self-assessment regarding attitudes to new sexual contacts while abroad correlates with the actual number of new sexual partners. This indicates a good self-evaluation by the volunteers regarding this topic.

Limitations

The organization that was a partner in this study (fid-Service- und Beratungsstelle in der AGEH in Cologne, Germany) appeared to offer ideal access to volunteers since it had contracts with several different NGOs. This provided the opportunity to enquire about risk determinants for different projects in one place and thus a chance to get a valid overview. Nevertheless, it is possible that volunteers sent abroad by smaller NGOs are more likely to attend training by these courses and hence be integrated into this study. Larger or more experienced NGOs may offer their own preparation seminars to the volunteers. The low response rate of 24% might be attributed to an extended time frame between the return from a social project abroad and the completion of our study as well as old or infrequently checked email addresses. This time frame may have also caused some recall bias, although for several topics (e.g. vaccination) this effect should be limited since the volunteers were asked to report the vaccination status based on their documents.

Volunteers in Latin America represented the largest group (100 of 153) but volunteers to other countries also show evidence of risk profiles that need to be confirmed in larger trials. As expected, volunteers working in Western countries present a different risk profile but are still mentioned to

include the experiences of volunteers in similar situations under Western standards. They still expose themselves to different risks compared to life in their home country. It should also be pointed out that there was a commendably high response rate to all questions, including personal topics such as sexual behaviour.

However, the traditional structure of the fid-Service as described above and the strong cooperation of the Catholic institutions with Latin America may have caused some bias, although social work itself should be independent of confession. To identify such bias, future studies should also include non-confessional organizations like the Red Cross, Malteser Hilfsdienst (originally Catholic), or Johanniter Hilfsdienst (originally Protestant). Another bias may be caused by the non-responders. Unfortunately, there are no data available to compare this group with the responders. Future studies should have a prospective design with data acquisition as an integral part of the training and the programme.

CONCLUSIONS

Young volunteers are exposed to or expose themselves to a number of risks during work and leisure time in international social projects of NGOs. Their risk profile, as expected, differs from those of other groups. Compared to groups with a higher mean age, the quantity and handling of sexual encounters is a major difference, especially regarding volunteers in Latin America. A reference to possible hygiene standards concerning meals, water supply, and sanitary facilities needs to be made in preparatory courses. Methods for disinfection of drinking water if not industrially bottled should receive more emphasis in order to minimize diarrhoea rates. Vaccination programs should be more focused when advising young travellers, especially in the case of typhoid fever for Asia and Africa and pertussis and measles for Africa. To improve preparation, high quality and thematically appropriate predeparture courses are needed, ideally in a combination of individual consultations and general seminars with practical training. It is important to not only lecture young volunteers but also be aware of their attitudes since risk-taking behaviour is associated with travel.

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